

WHAT IS CLAIMED IS:

1. A liquid crystal display apparatus,  
comprising:

a pair of opposed boards,

a liquid crystal layer and a liquid crystal  
driving unit which are held in being sandwiched between  
said facing substrates, and

polarizer and phase plates which are located  
on an upper side and on a lower side of said facing  
substrates, respectively, wherein a pixel of said  
liquid crystal display apparatus includes a reflection  
display unit whose reflections applied voltage  
characteristic is a normally-closed type and a  
transmission display unit whose layer thickness is  
thicker than that of a liquid crystal layer  
constituting said reflection display unit, said  
polarizer and said phase plate located on said lower  
side of said facing substrates forming an elliptical  
polarizer.

2. The liquid crystal display apparatus as  
claimed in Claim 1, wherein, when a layer-gap between  
said transmission display unit and said reflection  
display unit is set to be  $d$ , an effective birefringence  
of a liquid crystal material is set to be  $\Delta n$ , and a  
wavelength of a transmission light is set to be  $\lambda$ , an  
angle  $\theta$  formed between a slow axis of said lower-side  
phase plate and a transmission axis of said lower-side  
polarizer falls in a range of

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$$40^{\circ} - 180^{\circ} \times \Delta n d / \lambda < \theta < 50^{\circ} - 180^{\circ} \times \Delta n d / \lambda.$$

3. The liquid crystal display apparatus as claimed in Claim 1, wherein, when a layer-gap between said transmission display unit and said reflection display unit is set to be  $d$ , an effective birefringence of a liquid crystal material is set to be  $\Delta n$ , and a wavelength of a transmission light is set to be  $\lambda$ , an angle  $\theta$  formed between a slow axis of said lower-side phase plate and a transmission axis of said lower-side polarizer falls in a range of

$$43^{\circ} - 180^{\circ} \times \Delta n d / \lambda < \theta < 47^{\circ} - 180^{\circ} \times \Delta n d / \lambda.$$

4. The liquid crystal display apparatus as claimed in Claim 1, wherein said lower-side phase plate includes a first lower-side phase plate and a second lower-side phase plate, a retardation of said first lower-side phase plate falling in a range of 180 nm to 220 nm, a retardation of said second lower-side phase plate falling in a range of 200 nm to 400 nm.

5. The liquid crystal display apparatus as claimed in Claim 1, wherein said lower-side phase plate includes a first lower-side phase plate and a second lower-side phase plate, a retardation of said second lower-side phase plate being larger than that of said first lower-side phase plate, and a difference therebetween falling in a range of 180 nm to 220 nm, said retardation of said first lower-side phase plate falling in a range of 50 nm to 180 nm.

6. The liquid crystal display apparatus as

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claimed in Claim 1, wherein said lower-side phase plate includes a first lower-side phase plate and a second lower-side phase plate, a retardation of said first lower-side phase plate falling in a range of 50 nm to 180 nm, a retardation of said second lower-side phase plate falling in a range of 100 nm to 200 nm.

7. The liquid crystal display apparatus as claimed in Claim 1, wherein a twist angle of said liquid crystal layer falls in a range of  $40^{\circ}$  to  $70^{\circ}$ , a retardation of said liquid crystal layer falling in a range of 200 nm to 350 nm, a retardation of said upper-side phase plate falling in a range of 280 nm to 470 nm, a retarded-phase axis azimuth-angle of said upper-side phase plate falling in a range of  $30^{\circ}$  to  $75^{\circ}$ , an absorption axis azimuth-angle of said upper-side polarization plate falling in a range of  $30^{\circ}$  to  $90^{\circ}$ .

8. The liquid crystal display apparatus as claimed in Claim 1, wherein a twist angle of said liquid crystal layer falls in a range of  $75^{\circ}$  to  $85^{\circ}$ , a retardation of said liquid crystal layer falling in a range of 200 nm to 310 nm, a retardation of said phase plates falling in a range of 320 nm to 460 nm, a slow axis azimuthal angle of said phase plates falling in a range of  $105^{\circ}$  to  $145^{\circ}$ , an absorption axis azimuthal angle of said polarization plates falling in a range of  $25^{\circ}$  to  $65^{\circ}$ .

9. The liquid crystal display apparatus as claimed in Claim 1, wherein a twist angle of said

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liquid crystal layer falls in a range of  $50^{\circ}$  to  $100^{\circ}$ , said upper-side phase plate including a first upper-side phase plate and a second upper-side phase plate, a retardation of said second upper-side phase plate falling in a range of 50 nm to 280 nm, a retardation of said first upper-side phase plate being larger than that of said second upper-side phase plate, and a difference therebetween falling in a range of 70 nm to 190 nm.

10. The liquid crystal display apparatus as claimed in Claim 1, wherein a twist angle of said liquid crystal layer falls in a range of  $50^{\circ}$  to  $100^{\circ}$ , said upper-side phase plate including a first upper-side phase plate and a second upper-side phase plate, a retardation of said second upper-side phase plate falling in a range of 350 nm to 480 nm, a retardation of said second upper-side phase plate being larger than that of said first upper-side phase plate, and a difference therebetween falling in a range of 10 nm to 50 nm.

11. The liquid crystal display apparatus as claimed in Claim 1, wherein a twist angle of said liquid crystal layer falls in a range of  $50^{\circ}$  to  $100^{\circ}$ , said upper-side phase plate including a first upper-side phase plate and a second upper-side phase plate, a retardation of said second upper-side phase plate falling in a range of 380 nm to 480 nm, a retardation of said first upper-side phase plate being larger than

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that of said second upper-side phase plate, and a difference therebetween falling in a range of 80 nm to 120 nm.

12. The liquid crystal display apparatus as claimed in Claim 4, wherein, when an angle formed between a slow axis of said second lower-side phase plate and a transmission axis of said lower-side polarizer is set to be  $\phi$ , an angle formed between a slow axis of said first lower-side phase plate and said transmission axis of said lower-side polarizer falls in a range of  $2\phi + 35^\circ$  to  $2\phi + 55^\circ$ .

13. The liquid crystal display apparatus as claimed in Claim 5, wherein, when an angle formed between a slow axis of said second lower-side phase plate and a transmission axis of said lower-side polarizer is set to be  $\phi$ , an angle formed between a slow axis of said first lower-side phase plate and said transmission axis of said lower-side polarizer falls in a range of  $2\phi + 35^\circ$  to  $2\phi + 55^\circ$ .

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